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Notes Following a Visit to U.S.A. and Canada, October, 1943—April, 1944*

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In order that the methods of disease control adopted in the United States may be appreciated it is necessary to mention at the outset some factors which have a bearing on the position.

The size of the country is immense; it is about 3,000 miles from coast to coast and several individual States are much larger than the British Isles. The climate varies considerably throughout the States—for example, in the north there are fairly extreme conditions and temperatures reach very low levels (the lowest experienced on my tour was 27° below zero in Nebraska). In the western coastal area mild conditions prevail and the southern States may be described as semi-tropical. Rainfalls vary throughout the continent. Many areas are prone to suffer from drought—others have overmuch rain at particular times with a long dry season. The type of country varies from the lush growth of California; the deep rich soil of the Middle West; the good dairy land of the eastern States; the range country of the western States to the desert areas, such as parts of Arizona. Further, the country was settled from east to west and land was so easily obtained at one time that there was little incentive to farm well—when the farm ceased to pay the farmer moved westwards to virgin soil and continued to employ the same farming methods so long as they were profitable. It is partly for this reason that soil erosion is such a serious problem in some localities.

All this has tended towards specialisation in agriculture and it is unusual to find a general farm. There are areas where one method of farming is followed almost to the exclusion of others; for example, there are the dairying States of the east and north-east; the corn belt in the Middle West; the range areas; the wheat belt and the cotton growing area. There is a similar and partly consequent variation both in the type of stock reared and in the system of stock management throughout the States.

Under such conditions it is a very difficult problem to evolve a system of disease control which can be applied throughout the whole of the country. Diseases are controlled within each State and no real attempt is made at uniformity although the Bureau of Animal Industry co-operates in the work, particularly in the case of tuberculosis and Bang's disease. While this situation is one which it would be difficult to replace by central or Federal control, it would appear that State disease control is not an ideal method since there is no consistency even between neighbouring States in which the conditions are sufficiently similar to justify the same disease control measures.

The organisation responsible for disease control in each State is the State Sanitary Board. In the campaigns for the eradication of such diseases as tuberculosis and brucellosis the Federal Government and the State Government co-operate and compensation is paid to the owners of stock slaughtered—the Federal Government usually paying the same amount as the State. In the case of brucellosis, eight States do not pay compensation. In controlling other disease it may be necessary to impose restrictions—for instance, on movements of animals—in a wider area than that covered by a State and in this case Federal restrictions are imposed. The Federal Government is concerned also with inter-State movements of stock. Control, however, is mainly based on State regulations but the facilities of the B.A.I. are available to a State requiring assistance. A B.A.I. Inspector-in-Charge is stationed in each State to co-operate with the State officials. Practitioners employed on a part-time basis are accredited and in order to qualify are examined by the State Sanitary Board.

The Disease Position

Practically all the diseases mentioned are included in the Department of Agriculture Year Book for 1942, "Keeping Live Stock Healthy," which can be consulted.

It should be noted that there is no legal obligation on an owner to report suspicion of disease on his premises. Owners are, of course, encouraged to report and active measures are taken to stamp out disease whenever its presence is established: mainly the control measures are brought to the notice of the farmer by propaganda rather than by legislation. In view of this lack of notification and the somewhat loose methods of control adopted, statistics are not available to indicate the extent of disease but a general outline of the disease position may be of some value.

Diseases which are Notifiable in Great Britain

Foot-and-Mouth Disease.—Absent. The disease has been introduced into the U.S.A. from time to time and the slaughter method is followed in stamping it out. (See later under vesicular exanthema.)

Anthrax.—Occasional cases occur throughout, but in some southern States the disease is seen at times as an epizootic. For example, along the lower Mississipi valley the disease may become extensive in areas which normally are swamps but which provide grazing in times of drought. A considerable amount of anthrax vaccination is done in southern States and in range areas. Dead vaccine and spore vaccine with or without serum are used.

Pleuro Pneumonia and Rinderpest.—Absent.

Tuberculosis in Cattle.—All States are modified accredited, *i.e.*, there are less than 0·5 per cent. reactors. For the year to June 30th, 1943, 9,308,936 cattle were tested and 0·18 per cent. reactors found. (See also later.)

Sheep Pox.—Absent.

Sheep Scab.—This disease is still found in a few localities such as North Dakota and in an area south from there. Recently cases have been found in Illinois. It exists in a more or less latent form in Louisiana. Double dipping with lime and sulphur or nicotine dips is used for control.

Swine Fever.—This disease is known as hog cholera. It occurs in the "corn belt" in a very acute form. Less acute forms of the disease are seen in other areas. It is controlled by inoculations of serum and virus; vaccination with crystal violet vaccine and tissue vaccine is used but this is still in the experimental stage. (See also later.)

Epizootic Lymphangitis.—Absent.

Glanders.—Very occasional cases do occur.

Parasitic Mange.—There is evidence of this disease but it is not a problem.

Rabies.—Cases occur in several States. In some southern States dogs are vaccinated as a protection.

Fowl Pest.—Absent.

Diseases of Importance in Great Britain

Contagious Abortion.—The position varies considerably throughout the country; test and slaughter, calf vaccination, adult vaccination and combinations of those measures are used in control. (See also later.)

Infection with Br. melitensis.—This infection is found in Southern California and Utah. It is also found in Mexico. Usually the goat milk is made into cheese and the number of children showing agglutination response is low, whereas the adult population suffer more, in contradistinction to the position in Malta where the number of children infected is high due to drinking raw milk.

Trichomoniasis.—Trichomoniasis is found fairly widely throughout the dairying States. Research into methods of diagnosis and treatment of animals is proceeding. The disease is controlled within a herd mainly by discontinuing breeding for a period. (See also later).

Infertility.—There is evidence of a considerable amount of infertility throughout the country; generally control is left in the hands of practitioners.

Mastitis.—This is a serious problem. Much research work is in progress and some States are discussing control measures. (See also later.

Johne's Disease.—The disease is not apparently widely distributed but there is evidence of it in several areas. It is considered somewhat as it is in this country—a serious menace in individual herds.

Calf Scour and Calf Pneumonia.—These conditions are prevalent, particularly in the dairying States. Considerable research work has been done to establish the association between these conditions and vitamin deficiency and also in regard to treatment, particularly with sulphonamides. (See also later.)

* Embodying the substance of addresses delivered at meetings of the following Divisions, N.V.M.A.: North of Scotland, Western Counties, Derbyshire, Eastern Counties, Scottish Metropolitan and Ayrshire.

Blackquarter.—In some of the range States young stock is immunised either with vaccine or aggressin.

Swine Erysipelas.—This disease causes considerable losses in areas where extensive pig rearing is the practice. Serum is used extensively and there is an increasing employment of active immunisation for young pigs; the use of vaccine is still, however, in the experimental stage. (See also later.)

Enteritis.—Necrotic enteritis and bloody scours or dysentery are seen extensively where large numbers of pigs are reared. (See also later.)

Swine Influenza.—This condition in pigs is often seen in the pig rearing areas and is often found as a complicating factor in outbreaks of other diseases, notably swine fever.

Louping Ill.—Absent.

Braxy-like Diseases.—Are not a serious problem but do occur.

Enterotoxaemia.—This is seen in several areas. A paper on the subject has recently been published.

Pulpy Kidney.—This condition is also found.

Lamb Dysentery.—This disease occurs where lambing is continued on the same grounds for some years. The serum treatment has not been extensively adopted.

Pregnancy Disease.—This is found in all areas where sheep are kept. Treatment and prevention are on the usual lines.

Foot Rot.—Foot rot is a serious condition among lots of sheep. The treatment adopted is cutting out the affected parts and application of copper sulphate, etc., dressings. Preventive measures are also adopted. In cattle the condition is sometimes seen affecting a fairly large number of animals, particularly in feed lots.

Grass Sickness.—There is no evidence that this condition has been recognised as such. I was not in any area where horse breeding is extensive.

Pullorum Disease (*B.W.D.*).—Is country-wide. Extensive testing, mostly by the rapid test, is practised. (See also later.)

Fowl Paralysis.—All forms of the leucosis complex are in evidence. Research work is proceeding but no new methods of control were found. (See also later.)

Tuberculosis of Poultry.—The Northern, Mid-Western and North-Eastern States have the highest incidence. In general the disease is more prevalent in farm flocks than in specialised poultry plants. In some States a considerable amount of testing is done at the same time as the birds are tested for pullorum disease by the rapid method, and in addition, flock owners are encouraged to rear young birds and to dispose of birds after their second year in lay. Most of the large poultry plants take active control measures and in areas where these measures have been followed very few cases of tuberculosis in fowls were seen in the diagnosis laboratories visited. In some areas up to 60 to 85 per cent. of tuberculosis infection in pigs is estimated to be of the avian type.

Diseases not in Evidence in Great Britain

Glanders and rabies have already been mentioned under diseases notifiable in Great Britain.

Anaplasmosis.—This condition has been encountered in cattle in several range States. It presents a difficult problem, particularly as recovered animals remain carriers.

Texas Fever.—Anaplasmosis probably existed with Texas fever before that disease was brought under control.

Dourine.—Recently an outbreak of this disease was found in one of the Indian Reservations as the result of the diagnosis of dourine in a stallion which had been in use in that area. Horses are still being tested and the outbreak is now well under control. The complement fixation test is used for diagnosis.

Encephalitis.—This disease is found in several localities throughout the country. Two strains of virus are known to cause encephalitis and there is no cross immunity. Protection is afforded by vaccination which is extensively employed, and usually the vaccine is bivalent.

Brucellosis of Swine.—There is evidence of infection with *Br. suis* throughout the pig rearing areas. (See also later.)

Vesicular Stomatitis.—A recent outbreak in the pigs in a serum plant presented serious difficulty in differentiating from foot-and-mouth disease. It was not found possible to trace the origin of the infection—the disease is extremely uncommon.

Vesicular Exanthema.—This disease of pigs, which is at present entirely confined to California, is of considerable importance in that State because of the fact that it cannot be differentiated clinically from foot-and-mouth disease. The disease is found among pigs which are fed raw garbage. When it is encountered the premises are quarantined and calves are run with the pigs in order to differentiate from foot-and-mouth disease. The disease has once been found in corn-fed hogs in California but there was a definite indirect contact with garbage-fed pigs. It is accepted that the disease is carried by the unboiled swill but the method of its continuance is somewhat in doubt; it has been suggested that there is a reservoir of virus in another animal which does not exhibit signs of the disease: however, there has been no confirmation of this theory. Only the pig is susceptible to the virus but horses have occasionally been affected experimentally: of laboratory animals only the hamster is capable of infection and that only occasionally. Research into this disease continues but progress is hampered by the inability to infect experimental animals. This work is in the capable hands of Dr. Jacob Traum assisted by Dr. Madin.

Avian Pneumoencephalitis.—This virus disease of poultry is in evidence mainly in California. J. R. Beach, Division of Veterinary Service, University of California, has published on the disease and a reprint is available.

Parasitic Conditions

Most of the common parasitic conditions which prevail in the U.S.A. are *shortly* dealt with in the U.S. Department of Agriculture Year Book, 1942, "Keeping Livestock Healthy." In addition to those mentioned, liver flukes cause considerable loss in some range areas, notably in parts of Nevada: the range conditions make control both by attack on the snail and medicinal treatment of the cattle a difficult problem.

Coccidiosis causes extensive loss, particularly in sheep gathered into feed lots. Active research into this condition is proceeding at the B.A.I. Regional Laboratory at Auburn, Alabama. Dr. Hammond is conducting this work, which is not yet complete.

Phenothiazine is used for treatment of worm infestation directly, and incorporated in salt licks. It has been found that sheep will take sufficient phenothiazine from a salt lick to control parasitic infestation. The drug is effective against the nodular worm and has been used for this purpose since the incidence of this condition, seen in sheep in packing houses, had been greatly reduced where phenothiazine was used for treatment of other parasitic conditions.

Research work on the use of phenothiazine is still being done; phenothiazine, copper sulphate, nicotine sulphate and tetrachlorethylene have been compared for their efficiency against *Haemonchus contortus*. In addition to worm counts estimates of haemoglobin, white and red blood cells were also made as it was found that controls also showed considerable fluctuation in worm counts.

Deficiency Diseases

A number of deficiency diseases are to be found throughout the country. The most important are:—

Phosphorus deficiency in the range areas, and in some districts magnesium deficiency which has given rise to grass tetany, the same condition as is well known in this country.

Trace elements, notably iodine and cobalt, are deficient in certain localities also. Usually the prevention and treatment is by providing licks; the conditions on the farms do not make the dressing of the land a reasonable method of dealing with the diseases.

Vitamin A deficiency is of importance in some areas, notably under range conditions. Very occasionally cases of deficiency of other vitamins are found; cases were described in Michigan of vitamin C deficiency which was causing unthriftiness and scurfy skin in calves.

Tuberculosis

Every State in the Union is now Modified Accredited, *i.e.*, there are less than 0·5 per cent. reactors. This achievement is a very remarkable one, and great credit is due to all those who took part in the eradication campaign.

The extent of infection in the herds varied within a wide range and it is of interest to note that generally the eastern and north-eastern States, which were early settled, carried a high incidence of infection as did also the more intensive dairying area of California. In New York State where the position was studied most closely, the incidence varied also throughout the State and in one county the number of animals slaughtered since eradication was commenced equals the total cattle population of the county; in the whole State, approximately 1,000,000 cattle had been slaughtered as reactors between May, 1918, and October, 1937. In States where the incidence was originally low, the only real difficulty in eradication was the purely mechanical one of arranging and carrying out the tuberculin tests in the prevailing conditions. Serious difficulties in the way of opposition were also encountered: a whole State might be non-co-operative at first, as was indeed the case in California, the last State to be accredited; or the farmers individually or collectively might show resistance to the campaign. Opposition was gradually overcome but not without considerable difficulties.

The U.S.A. has usually had a surplus or a near surplus of cattle and no real danger of serious interference with the meat or milk supply was to be feared when slaughtering reactors, and consequently the test could be applied over wide areas simultaneously.

If this is compared with the position in Great Britain over the same period it will be appreciated that this point alone provides a very obvious reason for a different rate of progress in eradication in the two countries and suggests that when active measures of eradication are reintroduced and extended here it would be foolhardy to attempt to test cattle in numerous large areas at the same time; smaller areas must first be cleared to provide adequate replacement cattle.

At times, and particularly during the "depression" years, the price of cattle reached an extraordinarily low level: during such periods it was easy to pay for reactors and also the farmer was glad of a market for any of his cattle. In this country, although cattle prices have fluctuated, they have never reached such low levels.

The incidence of infection in the two countries is, of course, very different. In the U.S.A. the incidence never got beyond about 6 per cent. for the country as a whole, chiefly because of the fact that it was mostly new country—although the incidence was in the region of 26 per cent. in New York State whereas in this country the incidence is very much higher: the estimate usually quoted is that 40 per cent. of cattle are infected and is certainly false, based as it is on slaughterhouse figures and not on tuberculin tests; but it may be correct to say that about 40 per cent. *of cows* are affected. Whatever the position may be, it is clear that the percentage of reactors in this country is so much higher than it was in America that the problem of eradication is very different. The situation in New York State most nearly approached the situation here.

Another factor is that there was a far greater demand for eradication outside the purely farming interests. The large packing houses were insistant that something should be done to reduce the losses from this particular disease. Many large cities introduced milk ordinances which required that the milk supply to the city should come from tubercle-free cows and besides this public health incentive there was a definite drive from the milk industry which represents a very considerable financial investment. In Great Britain there has been some incentive from the public health side but medical opinion has never been unanimous that eradication must proceed and has sometimes been ill-informed on the subject. The numerous butchers in this country could not speak with the influence at the command of the organised large packing houses of America. The milk industry has never launched any organised campaign for eradication. Funds have only recently been made available for the commencement of this important undertaking, whereas in America with the pressure from the representatives of these important farming and public health interests, it was not difficult to have adequate funds available to meet each year's work.

Testing may be done by Bureau (Federal) or State and county officials or by practitioners employed on a part-time basis. The fees paid to practitioners vary considerably for this work but a few examples will suffice. New York State pays $2·50 per herd and 20 c. per animal with no additional mileage payment. (If blood is obtained for agglutination test or calves are vaccinated at the time of the test only one "herd" fee is payable.) In one county in New York the fee is 30 c. per animal with no "herd" fee. Iowa and Michigan pay $10 per diem, Arizona pays $5 for the first animal and $1 per head for the remainder; this higher fee arises from the fact that generally much greater distances have to be travelled.

The test employed in the early stages was the subcutaneous but this has been replaced by the single intradermal test in the caudal fold, frequently also accompanied by a test in the lip of the vulva. It is recommended that the tuberculin be injected sufficiently near the surface so that a small blister-like swelling can be seen after injection is complete. While this is so, it was noted that in actual field work not all veterinarians adopt this surface injection. Observation is made at the 72nd hour only, but subsequent observations may be made if there is any doubt as to the decision on the reaction produced. It was noted that a very slight response was not regarded as significant where no definite reactors are disclosed in the same herd and in that case such animals are usually retained in the herd. When reactors are disclosed and a suspicion of non-specific infection attaches to them, usually from the history of the herd or from the observation of skin lesions, retests are frequently made, but this is not a routine practice.

In retesting reactors the subcutaneous test may occasionally be used, and it is claimed that good results are obtained with this test. *Usually* two months is allowed to elapse before retesting. In New York, of 1,080 animals showing suspicious reactions, 664 reacted to the subcutaneous test and, of those, 402 showed lesions of tuberculosis, and 262 showed no visible lesions at *post-mortem* examination. In California where there are large numbers of animals showing skin tuberculosis, the ophthalmic test, using concentrated tuberculin, is used to retest reactors, and it is claimed that reasonable differentiation from skin tuberculosis and bovine tuberculosis can be obtained with this test. Many retests with the single intradermal test in the other caudal fold are also made.

Reactors are branded with a "T" on the left cheek and are slaughtered. *Post-mortem* examination is carried out by the meat inspectors on all reactors. This examination is a good "slaughterhouse" *post-mortem* examination but no attempt is made to amplify that examination by biological or other tests on material showing lesions, or on material which might contain organisms although apparently healthy.

In calculating the compensation to be paid the net salvage is deducted from the appraisal value and the Federal and State Government each pay one-third of this sum. The owner also receives the net salvage. Compensation varies from State to State by limitation of the maximum compensation paid and the Federal Government never pays more than the State. For instance, in New York and Iowa the maximum amounts paid are:—

	Pedigree.		*Non-Pedigree.*	
	State.	*Federal.*	*State.*	*Federal.*
New York ...	$150	$50	$90	$25
Iowa	$75	$50	$25	$25

The maximum paid in some of the smaller States is considerably lower than in New York or Iowa.

The number of reactors showing no visible lesions at *post-mortem* examination varies considerably in different areas, but in all States some such cases are found, anything from 15 per cent. to over 80 per cent. of no lesion reactors being encountered. It is believed that skin tuberculosis is responsible for the majority of anomalous reactions and there is ample evidence to show that this particular condition is a very serious problem in many areas. It was probably more in evidence in California than anywhere else but it was credited with causing a great deal of trouble in New York. It is clear that in some cases skin tuberculosis is not included among the N.V.L. cases. I was not convinced that avian infection could be dismissed as having no appreciable share in the sensitisations causing anomalous reactions. The northern and mid-western States show a high incidence of tuberculosis in poultry and it is known that from 60 to 85 per cent. of localised tuberculosis in pigs is caused by the avian type of organism. In some parts of this area 80 per cent. of reactors showed N.V.L. It seems reasonable to suggest that close laboratory *post-mortem* examinations would be required in reactors showing no visible lesions before infection with the avian organism could be safely ruled out as responsible for the sensitisation.

In addition, from lesions listed as tuberculous submitted for examination but in which no acid-fast organisms have been found, pentastomes were found to cause some lesions. For this reason, therefore, the figures quoted for N.V.L. cases may be low: no typing of organisms from lesions is done and a small percentage of the lesions recorded as tuberculous may well be caused by avian tuberculosis. On the other hand, some inextensive bovine lesions are probably missed at *post-mortem* examinations. (It is of interest to note in passing that extensive tuberculosis is so rarely seen at *post-mortem* examinations that many younger veterinary surgeons are not familiar with the lesions that we see only too commonly.)

It was estimated that about 3 per cent. of the cattle in California react but the actual official figure is lower because some reactors are left in the herds, having been retested on account of the presence of lesions of skin tuberculosis.

Traum has observed that the number of cases of skin tuberculosis has increased since infection with bovine tuberculosis in the herds has been reduced. The number of cases of bovine tuberculosis recorded where skin lesions have been demonstrated is not large but there is no doubt that the observation of skin tuberculosis in an animal is no guarantee of freedom from bovine tuberculosis unless the tuberculin test supports the belief; that is to say, that the reaction to mammalian tuberculin is not maintained on retest and that the ophthalmic test gives a negative result; and in this country that the comparative test, perhaps repeated, indicates freedom from bovine tuberculosis. Johnson has described cases of skin nodules, which from the description closely resemble skin tuberculosis, in animals which were reactors to johnin and which did not give positive reactions to mammalian tuberculin. An organism morphologically indistinguishable from *M. johnei* has been grown on solid medium containing *M. phlei*.

There is a generally held belief throughout the States visited that the veterinary surgeon carrying out the test should exercise some judgment in deciding on the animals to be removed as reactors: his judgment would be based on the previous history of the herd and the *post-mortem* findings in earlier reactors from

the herd. There can be no doubt that a decision to allow an animal showing a reaction which départs from the normal negative to remain in a herd is potentially dangerous, far more dangerous than retaining reactors to mammalian tuberculin which are judged to be safe according to the comparative test. There is no evidence that breaks in herds have resulted from this cause but it was noted that such evidence would be difficult to find, since in searching records for such evidence, it is likely that it would be found that there are no animals showing slight reactions with a recommendation that they should be retained: they would be recorded as negative if they were not retested. It must be stressed, however, that the general position in the country does not indicate any serious consequences from this cause at this stage.

When an animal other than a reactor is found to be affected with tuberculosis in a slaughterhouse a routine report is sent to the State of origin of the animal involved; there is usually little difficulty in tracing back to the herd of origin; when such a report is received the whole herd is tested. A number of breaks in herds have been disclosed as a result of these reports and where there is so little tuberculosis slaughterhouse reports are clearly most important as a check. As eradication proceeds in this country we must be in a position to obtain the necessary information from slaughterhouses.

Breaks do occur in herds which have apparently been free for a number of years and in addition there are still a number of scattered herds in some areas which constantly give trouble. In this connection it is interesting to note that several officials suggested that in some of these herds there had been bad testing at an earlier stage, in the sense that reactors had been left in the herds and had failed to react subsequently. Also it was evident that in some such herds the percentage of reactors was very high at the original test and that eradication would have been much quicker and much more efficient if the whole herd had been slaughtered at the time of the first test. Inspectors do have power to brand animals which they consider are dangerously exposed to infection even though they give a negative test result, but this is only used for odd animals. In New York it was even suggested that, in a county in which the number of reactors slaughtered has reached the total cattle population of the county, it would have been better to slaughter all the cattle at the time of first testing. Such a suggestion over such an area is of course quite impracticable but it is mentioned to show that in the U.S.A. there is a definite belief, based on experience, that in a heavily infected herd it is good practice to remove those animals which closely contact the reactors. This is the same principle which is followed in some of our "para. 6" herds in which the cows as a whole may be sold and the young stock retained to join a new herd of purchased cows.

As a check on the quality of the testing in a fairly wide area, the figures of animals coming into the dairy herds in Los Angeles County, California, are of interest. No latitude is given in these tests; the slightest response is accepted as a positive reaction. In addition, it is reasonable to assume that among animals sold off dairy herds there is likely to be included a small number which may have given some difficulty at an earlier test. In view of this the figures in Los Angeles County are the more significant; they showed in the year July, 1942, to June, 1943, that of close on 20,000 cattle tested on arrival 0·99 per cent. gave positive reactions. Dr. Hurt, the veterinarian in charge of Los Angeles County, informed me that the percentage of reactors has tended to fall this year. At Omaha (Nebraska) out of 915,000 cattle slaughtered in the first eleven months of 1943 only 105 were detained on account of a lesion of tuberculosis.

While bovine tuberculosis is no longer a problem which exercises the veterinary profession in America, nevertheless constant vigilance is necessary to maintain the position and the need for continued testing employs a high percentage of the time of the veterinary personnel, but the amount of work involved is amply justified by results and the system used requires less time than ours.

The single intradermal test can be done much more quickly than the double intradermal test: in the vast majority of tests only two visits are necessary and it is simple for the tester to carry out two series of tests in a week and if he is exclusively employed on this work three series may be undertaken. There is no reason to suspect that the single intradermal test is insufficient for the disclosure of a percentage approaching 100 per cent. of reactors sensitised by the bovine organism and in such a vast undertaking a small added percentage of failures would be offset by the very marked practical advantage in being able to undertake at least twice the amount of testing. If infection is known to exist in a herd for some reason such as the result of *post-mortem* evidence from a packing house, particular attention is given to the test and in such cases there is no reason to doubt the efficacy of the single intradermal test. There are, of course, cases where an animal affected with bovine tuberculosis fails to react to the single intradermal test as there are such cases with the double intradermal test.

At the same time there is no ground for complacency if *complete accuracy* is to be the aim. The number of no visible lesion cases is certainly high and there are grounds for believing that the position is not so good as the figures indicate. This is, of course, realised and research work proceeds on the question of obtaining a better tuberculin. The comparative test as used in this country could not be adopted on practical grounds; and in any case the percentage of non-specific reactions is much less than we have experienced, which alone would not justify the additional labour of the comparative test. In all the circumstances, it is clear that the ease of application and the reasonable accuracy of the single intradermal test makes it an ideal test for the American campaign. The only alteration which might be made would be the adoption of a more specific tuberculin when one is found.

The frequency of herd tests is of considerable importance in undertaking tests on the American scale. In the Individual Accredited Herd plan the frequency follows the provisions of the Attested Herds Scheme very closely. In a modified accredited area the frequency of tests in herds where infection has been disclosed is also similar. The remainder of the herds are tested in three years but if more than 1 per cent. of cattle in an area react all the cattle in the area are retested. In a modified accredited area in which a test discloses less than 0·2 per cent. reactors the area remains accredited for six years and provision is now made to allow such areas to remain accredited for a further period of three years but not to exceed the period of the war and six months after victory; in such areas infected herds are tested at the usual period for such herds. In addition, provision is made for testing only a portion of the cattle in range herds; and *post-mortem* reports from packing houses are, of course, very important in these herds. Uniform methods and rules are prescribed for the establishment of accredited areas; they also lay down the approved methods of testing but it is unusual for a herd to be tested other than by the single intradermal method.

That is the general plan but in practice the frequency of testing is left very much to the decision of the Bureau Inspector-in-Charge and the State veterinarian who take several points into consideration in reaching their decision. The main points are: (1) The percentage of reactors found in the area when first tested, and the rapidity and ease of progress towards complete eradication; (2) the type of cattle involved, *e.g.*, range cattle or dairy cattle; (3) whether the area is largely an importing one or is a self-supporting breeding area or an area where the movement is all to packing houses where the *post-mortem* records are available as a guide to the position. It was noted in Arizona that it is important to ensure in a generally range area that the dairy herds are more frequently tested. In individual herds supplying cities with milk the tests may be at frequent intervals, usually annual, if the city milk ordinance so requires.

It will be seen that the plan of area testing and Modified Accredited Area Plan have greatly reduced the number of tests required. This is an essential feature of the eradication scheme. Area testing has everything to recommend it: the infection can be elimited from a fairly large area in a comparatively short time and the risk of reinfection to individual herds is thus reduced; owners may be spared the necessity of taking precautions against contacts with neighbouring cattle such as double fencing; far less work is involved in ensuring that owners are alive to the risks of reinfection from purchased cattle, etc., as in a short time they can obtain all their replacements from within the area—at any rate there is practically no need of control of movements of cattle within the area.

In short, the *area freedom* is a great improvement over *herd freedom*, as much of an improvement as *herd freedom* was over *freedom of the individual animal*. The workers who were consulted are unanimous that area testing has been the greatest contribution to success.

The essential differences in the system adopted in America from that adopted in this country are: (1) The single intradermal test instead of the double; (2) the area plan instead of the individual herd plan; (3) the branding and slaughter with compensation, of reactors.

It is clear from the progress that has been made here that some method of shortening the time involved in testing must be adopted and this cannot well be done at this stage by sacrificing the higher specificity of the comparative test: in any case it is more the additional visit at the 48th hour which reduces an inspector's capacity for testing than the time he has to spend over the additional injection at the initial and 48th hour visit. We must seriously consider adopting a single intradermal comparative test for the purposes of eradicating tuberculosis from cattle. The other

points must obviously be considered in connection with our future work of eradication.

A matter which has been given considerable attention in the States is the extent of tuberculosis infection in poultry. In many States active measures are taken to reduce and eventually eradicate the disease. Testing is frequently carried out at the same time as the agglutination test and reactors are eliminated. In addition, encouragement is given to owners to maintain flocks of young birds and thus to minimise the risk of tuberculosis. Tuberculosis in pigs has already been mentioned; the reduction in tuberculosis found in cattle in packing houses has not been accompanied by an equal reduction in tuberculosis of pigs. The number of generalised cases in pigs has been greatly reduced it is true, but the number of pigs showing local lesions has been maintained to a surprising extent, particularly in some areas: Dr. Van Es at Lincoln, Nebraska, found that 85 per cent. of localised lesions were caused by the avian type of organisms. This has been mentioned in connection with the possibility of avian infection producing sensitivity to tuberculin in cattle in America but it has another significance as well, one which many veterinarians appreciated and which Dr. Van Es stressed, namely, that in a really successful campaign against tuberculosis based on the tuberculin test every effort should be made to reduce the possibilities of infection to cattle with any type of organism of the acid-fast group. This leads me to suggest that in this country it would be of great advantage to consider active measures for eradication of tuberculosis from poultry flocks. We know that wild birds are involved as carriers of infection in our problem, but the likely source of their continued infection is the flock of infected domestic birds.

Tuberculin.—The tuberculin used is produced from human strains on synthetic medium. For uniform standard they depend almost entirely on a standardised method of production. Protein is precipitated with acetic acid to ensure that it is present in *reasonable quantity*.

In producing P.P.D. tuberculin the precipation is done with silico tungstic acid and the precipitate is later redissolved to produce the tuberculin for use. Acetic acid and salt can also be used but does not give such a complete precipitation. P.P.D. tuberculin is used only in experimental work.

At Auburn, Alabama, where considerable work has been done on the production of johnin, tests have been carried out on cattle sensitised with several acid-fast organisms. In the tests six groups of approximately ten cattle each have been used; the groups were as follows: Sensitised 1, with *M. johnei;* 2, *M. tuberculosis* (human); 3, *M. tuberculosis* (bovine); 4, *M. tuberculosis* (avian); 5, *M. phlei*, and 6, control.

Tests were made at 60 days after sensitisation and monthly thereafter. They were tested with tuberculins, johnins and phleins in each case, usually with one produced in the usual way and a P.P.D. from each product; three dilutions of each were used, ½ dilution (= 25 per cent. O.T. or O.J.) and 1/40 and 1/400. A method of assessing the "active units" for each animal with each material was used, *viz.*, the increase in skin thickness × dilution added for each test. They also compared the results, using positive, doubtful and negative as criteria and giving a value of three for positive and two for doubtful.

These tests showed that the human and bovine infection gave closely similar results: Johne's infection and avian infection gave similarly close results. Johne's infection was potentially somewhat more likely to interfere with test results in cattle than avian; infection with *M. phlei* presents no problem.

In comparing tuberculins those under uniform production give consistent results, but johnins, for instance, vary in a wider range. There is also some evidence of variation in strain antigenicity.

The conclusion after discussion is that a tuberculin having a higher specificity would be the greatest contribution to accuracy in testing at present.

In the production of johnin considerable strides have been made at Auburn: notably, very quick and luxuriant growth has been obtained on synthetic media and the best growths are obtained when lymph gland is added to medium. The johnin used in the field tests has been P.P.D. prepared by adding 0·5 gramme of silico tungstic acid to 100 c.c. johnin, and when dissolved 1 c.c. sulphuric acid is added and the protein is precipitated. This is redissolved and usually sodium bicarbonate is added in redissolving.

Contagious Abortion

This disease presents a problem in the U.S.A. which it is extremely difficult to describe briefly. The incidence varies throughout the States and within each State to a remarkable extent. Some States, for example the Carolinas, have practically no infection; others in the more intensive dairying areas such as New York, Wisconsin and Minnesota have a high incidence, generally above 15 per cent. reactors; Michigan in the northern part of the State has a low incidence and in the southern part there are approximately 15 per cent. reactors. Range States have a serious problem in so far as the mechanical application of control measures is concerned but in the conditions under which the cattle are kept the disease does not spread rapidly and when reactors are removed the herd usually remains free. In dairy herds the young stock are usually in close contact with the cows and therefore the class of animal showing the highest incidence of abortion is the first calf heifer.

In the serious depression which overtook the States in the thirties a large number of cattle was slaughtered in periods of drought when it became entirely impossible to maintain life in the fairly large population of cattle. The price of cattle had dropped to such an extremely low level that this did not concern the farmer unduly; he was glad to be able to get rid of a proportion of his stock in exchange for some much needed dollars. In this situation the "test and slaughter" policy for Bang's disease was introduced, frankly as a method of reducing the number of stock, and aimed at improving the disease position at the same time. As an eradication measure this policy did not find favour throughout the whole country—many authorities, in California particularly, and elsewhere did not consider that the test and slaughter policy had any hope of success. Their view has been amply justified. That contagious abortion could be eradicated along the same lines as tuberculosis shows a failure to appreciate the completely different nature of the two diseases: whereas most of the possible methods of spread and introduction of tuberculosis are known, there is not such an extensive knowledge of these features in contagious abortion; whereas a very high percentage of reactors to the tuberculin test are incapable of causing spread of infection, many reactors to the agglutination test may be infective at some stage; each case of abortion in a herd is equivalent to an open case of tuberculosis; other species of animals, notably pigs, harbour organisms which are capable of establishing *active* infection in cattle; after a herd has been cleared of reactors the disease is apt to appear in a very active form and the herd is in a worse position than before.

Under the test and slaughter plan appraisal of value and indemnity are paid in the same way as for tuberculosis. The upper limit of compensation is usually less than is paid for tuberculosis, being as low as half the amount in some States. No compensation is paid for animals in a herd where vaccination, other than calf vaccination, is practised.

Blood samples are obtained with specially designed instruments. Several needles are used for a herd and are kept clean by attaching a rubber bulb and squirting disinfectant through them after use. These needles, fitting into the blood sample tube, ensure that there shall be no spilling of blood over the cowshed floor, etc., and the tube holder provides a good handle to grasp when inserting the needle.

In Michigan a trailer laboratory is used for carrying out blood tests. The plate test is used and one member of the team has a week on duty in the laboratory while the others obtain the blood samples. The worker in the laboratory can cope with samples from six men.

When the test and slaughter method was introduced some areas took up the work enthusiastically and made considerable headway. Such areas as showed conspicuous success, however, are mainly those which had already a low incidence of infection. Some areas, notably the State of California, did not adopt "test and slaughter" at all. As the work progressed with varying results strain 19 vaccination was being developed and came to be adopted as an adjunct to the test and slaughter method of eradication. Indeed the method of using the vaccine was decided upon so that vaccination could be used in conjunction with the slaughter policy since calves which are vaccinated young enough cease to show positive results to the agglutination test within about 18 months following inoculation.

As time went on and calf vaccination was used more and more extensively the use of the vaccine for adult animals came to be discussed as a further method of control. This, however, apart altogether from its value as a weapon aiming at control and ultimate eradication, presented problems which had by now become complicated; many cities had made milk ordinances which required that their milk supply should be from cows which had passed the agglutination test; States had made a negative agglutination test a prerequisite of entry of cattle into the State and some of them even require that the herd of origin is made up of animals which have passed the agglutination test. The position is further complicated by the fact that vaccine can be obtained by the farmers, who do obtain it and use it somewhat indiscriminately. It must be appreciated that in the American Press far more publicity is given to methods of control and treatment of animal diseases and

a farmer reading about adult vaccination in particular instances is often led to vaccinate his own herd or to request vaccination by his veterinary surgeon, although the circumstances in his own herd do not parallel those reported. A practitioner who advises such a farmer against adult vaccination may well be put into such a position that it is obviously better for him to vaccinate against his better judgment than to refuse to vaccinate against his client's wish, because there is nothing to prevent the farmer carrying out the vaccination himself if he is already persuaded that he wants it.

There are usually one or two plans in force in a State. In Michigan, for instance, the northern part of the State is remarkably clear of infection and the southern part has an incidence in the region of 15 per cent. In the northern part test and slaughter proceeds resolutely but calf vaccination is also practised. In the southern area reactors need not be removed for slaughter but are tattooed "MBR" and vaccinated calves are tattooed "BCV." In part the modification in the southern area is also a result of the fact that the State provides a definite sum ($100,000 per annum) and this sum is not adequate to extend slaughter of reactors into the more heavily infected area. In other States such as New York and Pennsylvania similar arrangements are made but there is not the same area demarkation.

The success of the test and slaughter method as such, or of calf vaccination in the field, or of adult vaccination is very difficult to assess because of the fact that in so many herds there has been a combination of methods in use. It is clear, as mentioned already, that "test and slaughter" has been a marked success in areas which are self-supporting and where there was a low incidence of disease in the first place; it has been successful also in range country even when the incidence is considerably higher, but in many herds in range areas calf vaccination is practised as well.

It should be noted that the figures published in connection with test and slaughter work are correct and accurate but misleading. When a herd shows reactors at a test and the number is too high for the owner to continue with "test and slaughter" that herd is no longer included in the figures quoted, and as the herds showing few reactors are the ones which continue with "test and slaughter" the figures show an apparent drop in the percentage of reactors which is not altogether a true reflex of the position. Such herds which had dropped out of the scheme were actually visited.

There is some field evidence of the results of calf vaccination. In New York State 25 herds were closely studied by the Bureau staff and there were 2·8 per cent. abortions among vaccinates in three years. There is evidence of breaks in herds in New York State. In these herds the more recent vaccinates resist infection but those which are carrying their third or subsequent calves contain a number which are not now sufficiently protected. In Michigan a case was quoted with an abortion rate of 30 per cent. in vaccinated first calf heifers. Apparently vaccination had been properly carried out as the calves all showed an agglutination response after vaccination, but presumably this response would be shown even if the viability of the vaccine was very low. This case is exceptional; in no other area was there any evidence of a break of such magnitude and it stood out among good results reported in the same State. Many herds using calf vaccination were visited in Iowa and the farmers there were convinced in every case that their position was markedly better since vaccination was commenced. (This work along with a similar observation of herds in the State which had practised adult vaccination was completed but not reported when the visit was made.) At Cornell University, experiments which are perhaps open to criticism because the infective dose was unknown (consisting of conjunctival instillation of a highly virulent field strain and exposure to infected membranes, etc.) show that there is a reasonable degree of resistance to infection which is not so marked when the animal has reached the stage of producing its third calf. At the Walker Gordon plant where some 1,500 cattle are milked the veterinary surgeon has been vaccinating calves for some years and finds there is some evidence of a failing immunity after the third calf stage. In all cases the officials contacted stressed the need for taking precautions against the introduction of the infection at the same time as using calf vaccination. It should be noted that since first calf heifers as a class show the highest incidence of abortion (in contradiction to the position in this country where under system of management the second calver shows the highest incidence) early (calf) vaccination may be expected to be of greater value for the reason that the resistance can be expected to be higher at the most dangerous period.

There is not much evidence of the value of adult vaccination. The work done in Iowa in general does not show any marked advantage of adult vaccination over calf vaccination alone. In California vaccination of all female stock is allowed throughout the State and there is good evidence in some herds, which have been closely observed, that with adult vaccination at the early stages and continued calf vaccination a herd can be completely cleared of infection and agglutination reactors. The work shows that vaccination has neither good nor bad effects in an infected animal. Pregnant animals are also vaccinated but vaccination is not recommended after the fifth month for the reason that it has been found more difficult to cause abortion earlier than the fourth month of pregnancy. Agglutinins persist longer in the adult vaccinates, more so in unbred heifers than in the older cows, and there is a suggestion that this may be because the cows have been exposed to infection earlier.

In the beef herd of Dr. Esseldon in Now York State vaccination and revaccination is practised. This herd showed a high incidence of abortion at one time. Animals are revaccinated at least at yearly intervals and gradually a herd showing an average titre of 1/650 has been built up. No abortions now occur and Dr. Esseldon, who is a surgeon in New York, is fully convinced of the value of continued vaccination. Only the fact that his milk trade would be interfered with, because he supplies milk under the condition that the cows have passed the agglutination test, prevents him from doing the same thing in his dairy herd.

At Beltsville over 100 pregnant cows at varying stages of pregnancy have been vaccinated and no untoward results seen. The general opinion is that vaccination of pregnant cattle is not dangerous, unless done at a fairly late stage of pregnancy.

In some States bulls are vaccinated. In New York State one case is recorded where strain 19 was recovered from the testicle of a vaccinated bull. The argument in favour of vaccinating bulls is that it will prevent these valuable animals from being removed as reactors later by protecting them against infection. Bulls are not vaccinated in California.

The situation at the moment, then, is this, that some States still resolutely abide by the test and slaughter policy and include calf vaccination as part of the policy: some combine test and slaughter with calf vaccination in certain herds while in other herds calf vaccination is done without slaughter of reactors; one or two have adopted adult vaccination as well as calf vaccination. In all these States there remains the possibility that the farmer will obtain and use vaccine without official guidance and the only real method of preventing such use of the vaccine is refusal to pay indemnity where anything but calf vaccination has been used. There was the definite belief in one area (Wisconsin) that occasionally an undesirable adult animal had been vaccinated by the owner prior to an agglutination test in order to have this animal slaughtered under the test and slaughter scheme. This obviously suggests that the appraisal value was reasonably high compared with the actual saleable value of the animal and this would be a likely contingency in the period when cattle values were so absurdly low. At the same time a negative agglutination test is a prerequisite of movement of animals between States.

The general conclusions reached were that test and slaughter can only succeed where the infection is low in the first place and where the purchase of cattle for replacements is very limited. The figures on "test and slaughter" herds are somewhat misleading. Calf vaccination is unlikely to succeed unless the usual hygienic measures and precautions against introduction of infection are adopted as there is general field evidence of breaks in herds in which calves only are vaccinated. There is no evidence which is reliable that vaccination does any harm either in pregnant or infected cattle. There is evidence that vaccination of mature and adult cattle is valuable in infected herds and that herds can become negative to the agglutination test after a few years of vaccination.

A campaign of adult vaccination or even vaccination of mature heifers in addition to calf vaccination is an excellent step to take in this country. The more widespread such vaccination can be made the better. Even herds which have no reactors should adopt calf vaccination and in infected herds consideration should be given to revaccinating these animals prior to service. If vaccination is to be the method used in controlling this disease in this country we must do everything possible to discourage the use of the agglutination test at this stage.

(To be concluded.)

Weekly Wisdom

I have long had the suspicion that if for a single year the specialists in every field of thought would systematically doubt and challenge every one of their current generalizations, taking nothing for granted, there would be stirring times in the way of new truth.—John M. Robertson, "Letters on Reasoning."

CLINICAL COMMUNICATION

Chronic Tympany of the Rumen

E. W. ASCOTT, B.SC., M.R.C.V.S.

Five cases of chronic tympany of the rumen in bovines are recorded below, each being due to a different cause.

1. Tuberculosis of the Posterior Mediastinal Glands

The subject was an aged cow and symptoms were as follows: Chronic cough, intermittent tympany and progressive loss of weight. Rumination was normal.

Post-mortem examination showed lesions of tuberculosis in the lungs and elsewhere. The posterior mediastinal glands formed a caseous mass, eight inches by five, pressing on the dorsal aspect of the oesophagus. The method of examination, namely, removal of the fore-limb and ribs of one side, enabled the relationship of the gland to the oesophagus, and of the mechanism of the obstruction, to be clearly seen while the thoracic viscera were still in position.

2. Tuberculosis of the Posterior Mediastinal Glands and of the Oesophagus

The subject was again a cow. Symptoms were more severe than in case 1, tympany being continuous, rumination absent, and the faeces being fluid and showing undigested food. A probang introduced into the oesophagus was arrested in the thorax, and when withdrawn caseous material was seen clinging to it.

Post-mortem examination showed tuberculosis of the lungs and other viscera. The posterior mediastinal glands were greatly enlarged and completely encircled the oesophagus, through the wall of which the disease had penetrated to cause ulceration of its mucous membrane. The lumen, being reduced to half an inch at the narrowest, was completely blocked by fragments of ingesta. (Case seen with D. R. T. Davies, M.R.C.V.S.)

3. Carcinoma of the Rumen

The subject was a young cow suffering from a slight chronic cough (ascribed to tuberculosis), continuous tympany of the rumen, and progressive loss of weight.

Post-mortem examination showed a minor degree of tuberculosis of the lungs and associated glands. Close to the oesophageal orifice was found a massive tumour, about nine inches by six inches, originating in the rumen. Histological examination (at the Royal Veterinary College) showed it to be a squamous-celled carcinoma.

4. Papilloma of the Reticulum

The subject was a nine months old calf which for a considerable time had shown an extraordinary degree of tympany and abdominal distension.

Post-mortem examination showed a large papilloma in the reticulum and chronic dilatation of the rumen. (Case previously recorded in *Vet. Rec.*, 1937, p. 1264.)

5. Open Safety-pin in the Reticulum

The subject was a yearling heifer which for a period of six months had shown continuous tympany, cessation of rumination, diminished appetite and unthriftiness.

Post-mortem examination showed an open safety-pin free in the reticulum, and a local fibrous thickening of the anterior wall of the reticulum.

GROWTH OF MILK RECORDING

It is now estimated by the Milk Marketing Board that the number of cows recorded under the National Milk Records Scheme is over 400,000, which represents nearly 17 per cent. of the total dairy herd on farms producing milk for sale. The annual report of the National Milk Records Scheme indicates also (says the *Farmer and Stock-Breeder* in its notice of the report) that there has been a substantial decline in the number of herd owners taking up the junior scheme, but a big increase in those adopting the senior scheme, leaving a net increase of 2,550 herds now recorded compared with last year.

The cost of recording has amounted for the year ended September 30th, 1944, to £238,452, and for milk testing £1,670, after setting the fees receivable against the total cost. These figures compare with £175,633 for recording and £693 for testing a year ago.

On the expenditure side salaries and wages account for £151,582, the next largest figure being £55,162 in respect of travelling expenses and allowances. On the income side of the accounts, fees received from members represented £104,738 against £74,203 last year, and the contributions from the Ministry of Agriculture and the Milk Marketing Board each amounted to £60,336.

The Milk Board explain that some increases in the cost of recording which have arisen during the year are due mainly to high wages and travelling expenses. As against this there is an improvement in the revenue and the deficiency of £11,446 is only a few pounds more than the figure in respect of last year.

ABSTRACT

[The Newer Sulphonamides in Veterinary Practice. Thorp, W. T. S. (1945.) *J. Amer. vet. med. Ass.* **106**. 75.]

The author discusses at length and in a practical way the various sulphonamide preparations now available for veterinary use, their toxicity, method of dosing and their specific effects. The products referred to are:—

Sulphanilamide	(1)
Sulphapyridine	(2)
Sulphathiazole	(3)
Sulphadiazine	(4)
Sulphamerazine	(5)
Sulphaguanidine	(6)
Sulphasuxidine	(7)
Sulphathalidine	(8)

Toxicity. In considering this aspect of the problem, the rate of absorption and excretion, the degree of acetylation and the degree of dehydration of the subject have all to be taken into account. The latter factor will, of course, influence the rate of excretion from the kidneys.

The drugs which are readily absorbed and develop a high blood concentration in a short time are (1), (2), (3), (4) and (5); those which are not readily absorbed and act as intestinal bacteriostatics are (6), (7) and (8). These do not appear in appreciable amounts in the blood stream, even if given in excessive doses. If (6) is given in a dose of three to four times the therapeutic dose nephritis and uraemia occur and where the blood concentration exceeds 6·0 mg. per cent. crystallisation occurs in the kidney tubules; (7) and (8) are not absorbed but do not have the same serious effect if given in excess. Calves will tolerate larger doses of (3) than (2), (4) and (5) though the therapeutic effect of increasing the dose is negligible.

The effects of several of the group on pneumonia in calves are discussed in detail and recorded in very full tables. Briefly the data are as under:—

Sulphathiazole—dose* never more than 3·5 per lb. body weight; calves under 50 lb. not more than 1·0 per lb. body weight, given daily over five days.

(Selected example was a calf 122 lb.: daily doses 8·5, 8·5, 4·5, 4·0, 3·0 grammes.) Of 33 affected calves 29 recovered rapidly, two slowly and two died. This drug has also been used successfully in pneumonia in horses given either orally or intravenously; in septicaemia and mixed infections in dogs at the rate of 1·0 per lb. body weight and in coryza in chickens.

Sulphadiazine—brought about recovery in about eleven out of twelve calves suffering from pneumonia although more slowly than was the case with sulphathiazole.

Sulphamerazine—was effective in ten out of 16 calves, four others recovered slowly and two died. This was given at the rate of 1·0 per lb. body weight. This drug has the advantage over (4) in that it is more rapidly and completely absorbed from the digestive tract and reaches a maximum concentration more quickly. In addition, an adequate blood concentration is maintained with less frequent doses than is the case with the other sulphonamides.

Sulphathalidine—was tried out on a group of 75 cases of calf scours (dose 0·7 to 1·8 per lb. body weight). Seven of the calves did not respond to treatment and died of the disease.

Sulphaguanidine—is also referred to as effective in calf scours; on the therapeutic level of dosage 95 per cent. of the drug was recovered in the excreta.

In connection with the use of (7) and (8) the authors give a word of warning and indicate the danger that may lie ahead by interfering with the synthesis of the vitamins, more especially the B complex produced in the rumen. These two substances suppress bacterial growth and in particular have a marked effect upon the coliform content.

In chickens experiments have revealed that (3) is the least toxic, (5) the next and (1) and (2) are most toxic. In this species absorption appears to be very irregular thus the toxicity level is difficult to assess.

The comprehensive tables herewith included give a valuable picture of the wide range of disease which may be prevented by sulphonamide therapy.

N. S. B.

(Tables V and VI overleaf)

* Dosage given in grains except where otherwise indicated.

TABLE V.—SHOWING DOSAGES WHICH HAVE BEEN USED FOR SULFATHIAZOLE, SULFADIAZINE AND SULFAMERAZINE

Sulfonamide	Disease	Animal	Ave. No. Days Adm.	Initial Intravenous Doses	Daily Oral Dose	Remarks
Sulfathiazole	Pneumonia	Calf	5		1-1·5 gr. per lb.	Reduce by ½ on third day.
Sulfathiazole	Pneumonia	Sheep	5-6		1 gr. per lb.	
Sulfathiazole	Pneumonia	Horse	4-5	500 c.c. 5 per cent. sodium sulfathiazole	1 oz. at 6 hr. intervals*	Reduce to ½ oz. on second day.
Sulfathiazole	Pneumonia	Dog	5-8		1 gr. per lb.	Reduction based on progress.
Sulfathiazole	Septicemia	Dog	5-8		1 gr. per lb.	Reduction based on progress.
Sulfathiazole	Septicemia	Cattle	4-5	38 gr. in 50 c.c. dist. water per 100 lbs. wt.	1 gr. per lb.	Until recovery.
Sulfathiazole	Coryza	Chicken	3-5		22·5 gr. per oz. of mash	
Sulfadiazine	Pneumonia	Calf	4-5		1 gr. per lb.	Reduce by ½ on third day.
Sulfadiazine	Pneumonia	Dog	5-6		1 gr. per lb.	
Sulfamerazine	Pneumonia	Calf	5		½-1 gr. per lb.	
Sulfamerazine	Influenza-like infection	Dog	5-8		1 gr. per lb.	
Sulfamerazine	Distemper respiratory	Cat	5-8		1 gr. per lb.	

* Used sulfanilamide as oral dosage

TABLE VI.—SHOWING DOSAGES WHICH HAVE BEEN USED FOR SULFAGUANIDINE, SULFASUXIDINE AND SULFATHALIDINE

Sulfonamide	Disease	Animal	Ave. No. Days Adm.	Daily Oral Dose	Remarks
Sulfaguanidine	Scours	Calf	5-6	75-100 lb. calf, 225 gr.	Reduce on third day to 150 gr., on succeeding days to 75 gr.
Sulfaguanidine	Enteritis	Swine	6-8	75 gr. for each 30-50 lb. of bw.	
Sulfaguanidine	Enteritis	Sheep	4-6	75 gr. for each 100 lb. of bw.	No reduction.
Sulfaguanidine	Enteritis	Dogs and cats	6-8	7·7 gr. for each 20 lb. of bw.	No reduction.
Sulfaguanidine	Coccidiosis	Poultry	7-14	0·5-1 per cent. of mash	Checks development of oocysts.
Sulfaguanidine	Coccidiosis	Calf	3 days a week for 6 weeks	150 gr. in 75 gr. doses for 3 days every other week	Checks development of oocysts.
Sulfaguanidine	Coccidiosis	Lamb	6-8 weeks	15-30 gr.	Checks development of oocysts.
Sulfasuxidine	Scours	Calf	5-6	3-5 gr. per lb.	No reduction.
Sulfasuxidine	Dysentery	Dog and cat	2-4	15-30 gr. in 4 doses	No reduction.
Sulfathalidine	Scours	Calf	3-4	0·7-2 gr. per lb.	No reduction.
Sulfathalidine	Enteritis	Swine	6-8	0·7 gr. per lb.	No reduction.
Sulfathalidine	Dysentery	Dog	6-8	1·0 gr. per lb.	No reduction.

Questions and Answers

"Questions and Answers" will be published on alternate weeks.

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Therapeutic Use of Infra-red Rays

Q. CXXXVII.—*What is the requisite length of exposure to infra-red rays for adequate therapeutic treatment?*
What conditions derive most benefit from such treatment?

A.—Whilst ultra violet rays are cold and only slightly penetrating, the infra-red rays are hot, are of considerably longer wavelength and are capable of deep penetration. Both kinds of ray are invisible. After entry into the tissues the infra-red rays are absorbed and transformed into latent heat which is carried away by the lymph and blood streams to deeper parts. They are said to set the blood into maintained forced oscillation, to amplify the capillary blood circulation and, in consequence, to draw blood to the surface from other congested parts.

For the infra-red irradiation of animals the non-luminous type of emitter would probably be safest although the tungsten filament incandescent electric lamp is said to provide an emission spectrum with the highest percentage of wavelengths around 11,000 A.U. Conditions in the human being said to respond to infra-red radiation are mainly the neuralgic and rheumatic type of affections. Some claim is also made in respect of skin diseases such as acne, boils, furuncles, eczema and psoriasis, although it is admitted the radiation is not bactericidal.

Whatever may be the manner in which they produce their effects in therapeutics, these rays are most valuable. But it is pre-eminently a treatment of *symptoms*, particularly of pain, in the relief of which it is probably as good as any other. For those cases of collapse and subnormal temperature which sometimes follow upon severe operations, injuries, enteritis, etc., radiant heat applied directly over the animal's body is far more effective and salutary than hot-water bottles. For continuous application, the source of rays should be a greater distance from the body—say, four or five feet. For short application (15 to 20 minutes is the average time allowed) the lamp is placed about two feet from the animal. Irradiation is carried out daily if the whole body is exposed, or twice daily if only a local part is exposed.

Nevertheless, the veterinary therapist would be well advised to bear in mind that treatment is non-specific and that the effects of it are likely to be the result of heat only. Providing precautions against actual burning or general overheating are taken untoward results are improbable. In the treatment of the human subject protection of the eyes is recommended and under some circumstances such protection might be indicated in animals.

"Track-leg" in Greyhounds

Q. CXXXVIII.—*What is the best treatment for "track-leg" in greyhounds?*
(1) *When the dog is lame.*
(2) *When the dog has never been lame.*
Does the swelling persist after cure, or does it go right away?

A.—Some difference of opinion exists as to the cause of this condition. It may be due to bruising of the tendinous insertion of the muscle with subsequent synovial filling in the region, often affecting the periosteum. Severe cases occur only when an affected animal is raced repeatedly. Alternatively "track-leg" may refer to strain or even rupture of muscle.

With regard to treatment, two methods are suggested:—

(*a*) If an accumulation of fluid has occurred rest and cold compresses are advised. If the swelling persists apply tinct. iodi. *mitis* daily with light friction until there is evidence of blistering. Cases which do not respond should be pin fired, three points in line usually being sufficient. When sound, hand gallop until fit.

(*b*) Aspirate any fluid, under strict aseptic precautions, using a hypodermic needle of moderate calibre. One may then either foment repeatedly with hot water, or apply a blister ointment, taking care that efficient means of restraint are imposed to prevent licking or other interference. Many weeks of enforced rest are essential, as too early a return to work will cause a recurrence. The slighter cases can be treated by rubbing in stimulating liniments each day, or by the inunction of Scott's dressing (Ung. hydrarg. Co.) daily for several days.

The writer's experience is that lameness is always present in cases of sprained muscle and persists for a very long time. If no lameness is present (and the questioner asks for treatment in such cases), then one would presume the lesion was an old and healed one, the presence of which was indicated only because a fibrous hardening had taken place, which might never be lost. In such a case no treatment is called for, except judicious and continued training in order to strengthen the musculature to resist new injury.

Prevention of Conception in the Bitch

Q. CXXXIX.—*Are there any successful methods of preventing conception in the bitch apart from oophorectomy and the prevention of copulation?*

A.—(*a*) When a bitch has been accidentally mated at oestrus, the ova which are presumed to have been fertilised can sometimes be prevented from embedding and developing in the uterine horn if immediate steps be taken to keep the mucous membrane in the oestrous phase for a number of days. It has been said that 36 hours is the limit of delay, but the writer believes the limit to be much shorter. By repeated injections of oestrogenic substances in doses adequate to override the influence of the corpora lutea, this aim can be achieved and the fertilised ova eliminated in the vaginal discharges. A remedy suggested by Ernst and others is 5 mg.

oestradiol benzoate (*i.e.*, 1 c.c. of 50,000 I.U.) intramuscularly on alternate days to a total of 15 mg. in three injections. Another method is the injection of stilboestrol dipropionate in oil in doses of 1 to 5 mg. at each injection, according to the circumstances.

The writer used stilboestrol in oil on a cocker bitch within 24 hours of service, following it up on the next two days with a similar dose of 2 mg. each, and the bitch failed to become pregnant. Larger doses may be tried but toxic effects must be watched for. The enquirer is referred to a similar query answered in these columns on March 10th, 1945.

(*b*) According to a recent clinical article in *The Veterinary Record*, a method of sterilising bitches by section of the anterior vagina or body of the uterus has been practised. This obviously prevents conception by preventing access of spermatozoa further than the vagina. That the method is an objectionable one is proved by the article in question, in which pyometra had occurred in the separated uterus. A more satisfactory method would be the section or ligation of both Fallopian tubes, so preventing ova from reaching the uterus; this method has the advantage that the bitch is not rendered a neuter. So far as the writer is aware, contraceptive treatment by chemical or mechanical means *per vaginam* has never been recorded although quinine pessaries have been used in the treatment of vaginitis. Presumably these could also be used in a contraceptive capacity, but they would probably need to be inserted at least twice daily and would need to be placed anterior to the band of voluntary muscle in the vagina, a proceeding of some difficulty in other than small bitches.

In view of the fact that the period of oestrus in a bitch lasts only a matter of five or six days and seldom recurs more than twice yearly, it would seem that methods of preventing conception other than by segregation of the female are rarely necessary.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Feb. 5th, 6th and 7th.—Hampshire W.A.E.C. Conference on the Mechanization of Milk Production, at Winchester (Guildhall).

Feb. 6th.—Meeting of the Sussex Division, N.V.M.A., at Brighton (Old Ship Hotel) 2 15 p.m.

Feb. 7th.—Meeting of the Central Veterinary Society, at the Royal Veterinary College, Great College Street, London, N.W.1, 2 p.m.

Feb. 7th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Peterborough (Angel Hotel), 2 p.m.

Feb. 14th.—Institute for the Study of Animal Behaviour. Council Meeting, 2 p.m. General Meeting, 3 p.m. At Zoological Society of London, Regent's Park, N.W.8.

Feb. 21st.—Meeting of the Southern Counties Division, N.V.M.A., at Bournemouth.

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AMENDMENT OF THE TUBERCULOSIS ORDER

The Minister of Agriculture and Fisheries has made the Tuberculosis (Amendment) Order of 1946 which comes into operation on February 1st. It makes minor amendments of the Tuberculosis Order of 1938 under which bovine animals affected with certain forms of tuberculosis are liable to compulsory slaughter with compensation.

Apart from amendments of a technical character, the new Order extends the scope of the Order of 1938 to include bovine animals which are excreting or discharging tuberculous material. Since diagnosis may depend entirely on microscopical examination of material, the Order does not add to the present obligations of owners to give notice of disease; but if a veterinary surgeon examines any bovine animal in the course of his private practice and finds that it is excreting or discharging tuberculous material, he must give notice of the fact to the police or to a veterinary inspector.

The text of the amendments of this Tuberculosis (Amendment) Order of 1946 is as follows:—

Amendment of Article 6 (Compensation) of the principal Order

1. (1) In sub-paragraph (*c*) of paragraph (2) of Article 6 of the Tuberculosis Order of 1938 (hereinafter referred to as the principal Order) the following words shall be inserted after the word "widespread":—

> ", that is to say, where there are tuberculous lesions in two or more carcase lymphatic glands in addition to lesions in two or more other lymphatic glands not confined either to the thoracic cavity or to the abdominal cavity; 'carcase lymphatic glands' for this purpose excludes the suprasternal, xiphoid, superficial prepectoral and subdorsal glands but includes the renal and supramammary glands together with any other lymphatic glands which normally remain in a dressed carcase."

(2) In sub-paragraph (*d*) of the said paragraph (2) the following words shall be substituted for the words "the substance or membranes of any two of the following: spleen, kidney, udder, any part of the reproductive system and any part of the central nervous system":—

> "any two of the following: the substance of the spleen, of the kidney, of the udder, of any part of the reproductive system, and the substance or membrane of any part of the central nervous system."

Miscellaneous Amendments

2. (1) In Article 14 of the principal Order the following words shall be added to the definition of the expression "Affected animal":—

> ", or is excreting or discharging tuberculous material,"

and in the definition of the expression "Cow" after the words "that has calved" there shall be added the words "or is in milk."

(2) In Form C (*Notice of Intended Slaughter*) set forth in the First Schedule to the principal Order after (*d*) there shall be inserted:

> "(*e*) excreting or discharging tuberculous material."

The new Order comes into operation on February 1st.

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MILK (SPECIAL DESIGNATIONS) REGULATIONS, 1936-46*

Prescribed Tests for Pasteurized Milks

In an announcement concerning the Milk (Special Designations) Regulations, 1946, which come into operation on March 1st, 1946, the Ministry of Health states: "The effectiveness of the phosphatase test as a test whether milk has been adequately heat-treated is now well established, and the Minister has decided that compliance with the test should be added to the conditions of a licence for Pasteurized Milk and Tuberculin Tested Milk (Pasteurized). At the same time, the Minister is advised that the plate-count test, as prescribed for these milks in the Milk (Special Designations) Order, 1936, is defective not only because a wide margin of error appears inevitable in arriving at the result of the count, but more particularly because the test takes account of heat-resistant organisms whose presence is of no material significance for the safety or the keeping quality of the milk.

"The Minister has, therefore, as an immediate step, and pending any further revision of the conditions relating to licences for these milks which may be necessary, made the new Regulations which rescind the plate-count test and require that both Pasteurized Milk and Tuberculin Tested Milk (Pasteurized) shall comply with the phosphatase test and with the methylene blue test in the form in which those tests have already been prescribed for Heat-Treated milk by the Heat-Treated Milk (Prescribed Tests) Order, 1944."

* Statutory Rules and Orders (1946) No. 10. H.M.S.O. 1d.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Foot-and-Mouth Disease:

Angus.—Black Hall, Menmuir, Brechin, Angus (Jan. 21st).

Cornwall.—Butcher's shop, St. Merryn, Padstow, Cornwall (Jan. 16th); Trequite Farm, St. Kew, Bodmin, Cornwall (Jan. 18th).

Norfolk.—Cherry Tree Farm, Lyng, Norwich, Norfolk (Jan. 17th).

Swine Fever:

Devon.—22, North Street, Braunton, Devon (Jan. 19th).

Lincs. (*Kesteven*).—Hospital Farm, South Rauceby, Sleaford, Lincs. (Jan. 16th).

Midlothian.—Cardowan House, Stepps, Glasgow, Midlothian (Jan. 15th).

Northants (*Soke of Peterborough*).—Piggeries, Bedford Street (Jan. 16th) and Gunton's Road, Newborough, Peterborough, Northants (Jan. 18th).

Notts.—Westwood Farm, Laxton, Newark, Notts. (Jan. 16th).

Yorks., W.R.—3rd Avenue, Dolphin Gardens, Sheffield, 9, Yorks. (Jan. 17th).

Sheep Scab:

Denbighshire.—Pen-y-Bryn-Llan Farm, Llannefydd, Denbigh, Denbighshire (Jan. 15th); Llwydfan, Talycafn, Denbighshire (Jan. 17th).

Merioneth.—Bryncyfergid, and Garreglwyd Farm, Festiniog, Blaenau Festiniog, Merioneth (Jan. 18th); Bron Danw, Llanfrothen, Penrhyndcudraeth, Merioneth (Jan. 18th).

Veterinary Surgeons' Fees and Tariff Insurance Companies

In our issue of November 17th we informed our readers that, following representations made by the National Veterinary Medical Association, the Accident Offices Association (central body of the tariff insurance companies) had decided that in respect of examinations conducted on and after December 1st, 1945, there would be the following percentage increases, to be shown as such on accounts, in the scale of maximum fees:—

Turn-out fees (regardless of value)	...	50 per cent.
Per capita fee up to £100 value ...	...	50 per cent.
Per capita fee over £100 to £300	...	33⅓ per cent.

We now publish the list of members of the Accident Offices Association, which is as follows:—

Alliance Assurance Co., Ltd.
Atlas Assurance Co., Ltd.

Beacon Insurance Co., Ltd.
Britannic Assurance Co., Ltd.
British Equitable Assurance Co., Ltd.
British Fire Insurance Co., Ltd.
British General Insurance Co., Ltd.
British Law Insurance Co., Ltd.
British Oak Insurance Co., Ltd.
British Traders' Insurance Co., Ltd.

Caledonian Insurance Co.
Car and General Insurance Corpn., Ltd.
Celtic Insurance Co., Ltd.
Central Insurance Co., Ltd.
Century Insurance Co., Ltd.
Commercial Insurance Co. of Ireland, Ltd.
Commercial Union Assurance Co., Ltd.
Congregational Insurance Co., Ltd.
County Fire Office, Ltd.

Ecclesiastical Insurance Office, Ltd.
Economic Insurance Co., Ltd.
Edinburgh Assurance Co., Ltd.
Employers' Liability Assurance Corpn., Ltd.
Essex and Suffolk Equitable Insurance Society, Ltd.

Fine Art and General Insurance Co., Ltd.
Gresham Fire and Accident Insurance Society, Ltd.
Guarantee Society, Ltd.
Guardian Assurance Co., Ltd.
Guardian Eastern Insurance Co., Ltd.
Guildhall Insurance Co., Ltd.

Hibernian Fire and General Insurance Co., Ltd.

Insurance Corporation of Ireland, Ltd.
Irish National Insurance Co., Ltd.

Law Accident Insurance Society, Ltd.
Law Fire Insurance Society, Ltd.
Law Union and Rock Insurance Co., Ltd.
Legal Insurance Co., Ltd.
Legal and General Assurance Society, Ltd.
Licenses and General Insurance Co., Ltd.
Liverpool and London and Globe Insurance Co., Ltd.
Liverpool Marine and General Insurance Co., Ltd.
Local Government Guarantee Society, Ltd.
London and Manchester Assurance Co., Ltd.
London and Scottish Assurance Corpn., Ltd.
London and Provincial Marine and General Insurance Co., Ltd.
London Assurance.
London Guarantee and Accident Co., Ltd.
London and Lancashire Insurance Co., Ltd.
Mercantile and General Insurance Co., Ltd.
Motor Union Insurance Co., Ltd.

National Boiler and General Insurance Co., Ltd.
National Guarantee and Suretyship Association, Ltd.
National Insurance Co. of Great Britain, Ltd.
North British and Mercantile Insurance Co., Ltd.
Northern Assurance Co., Ltd.
Norwich Union Fire Insurance Society, Ltd.

Ocean Accident and Guarantee Corpn., Ltd.

Palatine Insurance Co., Ltd.
Patriotic Assurance Co., Ltd.
Pearl Assurance Co., Ltd.
Phoenix Assurance Co., Ltd.
Planet Assurance Co., Ltd.
Provident Accident and White Cross Insurance Co., Ltd.
Prudential Assurance Co., Ltd.

Queensland Insurance Co., Ltd.

Railway Passengers Assurance Co.
Reinsurance Corporation, Ltd.
Royal Insurance Co., Ltd.
Royal Exchange Assurance.
Royal London Mutual Insurance Society, Ltd.
Salvation Army Fire Insurance Corpn., Ltd.
Scottish Insurance Corpn., Ltd.
Scottish Boiler and General Insurance Co., Ltd.
Scottish Metropolitan Assurance Co., Ltd.
Scottish Union and National Insurance Co.
Sea Insurance Co., Ltd.
South British Insurance Co., Ltd.
State Assurance Co., Ltd.
Sun Insurance Office, Ltd.

Tariff Reinsurances, Ltd.

Union Assurance Society, Ltd.
Union Insurance Society of Canton, Ltd.
United British Insurance Co., Ltd.
United Scottish Insurance Co., Ltd.

Victory Insurance Co., Ltd.
Vulcan Boiler and General Insurance Co., Ltd.

Warden Insurance Co., Ltd.
Welsh Insurance Corpn., Ltd.
Wesleyan and General Assurance Society
West of Scotland Insurance Office, Ltd.
Western Assurance Co.
Western Australian Insurance Co., Ltd.
Westminster Fire Office.
World Auxiliary Insurance Corpn., Ltd.
World Marine and General Insurance Co., Ltd.

Yorkshire Insurance Co., Ltd.

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R.C.V.S. OBITUARY

Hodgins, Adam, D.S.O., M.R.C.V.S., Lieut.-Colonel (late R.A.V.C.), Ferns Hollow, Killaloe, Co. Clare. Graduated Dublin, July 23rd, 1906. Died at Barrington's Nursing Home, Limerick, January 17th, 1946.

Lyle, John, Veterinary Inspector, Ministry of Agriculture. Graduated Liverpool, December 19th, 1907. Died January 14th, 1946; aged 65 years.

Mr. John Lyle, M.R.C.V.S.

We record above, with deep regret, the death of one of the Ministry's officers, Mr. John Lyle, M.R.C.V.S. Mr. Lyle came originally from Northern Ireland and about 40 years ago became Assistant to Mr. T. M. Inglis, of Forfar. He later became a partner with Mr. Inglis and then left to become Angus County Veterinary Officer, a post which he held for about eleven years until 1938, when he was taken over as a Veterinary Inspector by the Ministry.

A colleague writes of him: "I suppose there were no outstanding events, as generally understood, in his career—yet his whole life was outstanding. In his private and professional life he was of a retiring nature, but his sterling ability combined with his quiet charm of manner made his name revered for many miles around Forfar."

The Late Mr. S. A. Winkup, M.R.C.V.S.

In our last issue we recorded with much regret the death, which took place after a short illness, of Mr. Sydney Ashworth Winkup, M.R.C.V.S., of Castle Street, Montgomery. "In his passing," says the *Montgomery County Times*, "Montgomery has lost one of its most esteemed and respected members. Mr. Winkup, who was both talented in his profession and genial and generous by nature, had been in practice as a veterinary surgeon at Montgomery for the last 35 years, succeeding the late Mr. James McGavin, M.R.C.V.S. He was for several years a member of the Montgomery Town Council."

Mr. Winkup is survived by his wife and their only child, Mrs. Maurice Jones, of Lydbury North, to whom deep sympathy is extended in their bereavement.

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PERSONAL

Major Hancock Appointed Chief Veterinary Officer to the R.S.P.C.A.

The decision of the Royal Society for the Prevention of Cruelty to Animals to make an important new veterinary appointment at Headquarters will be welcomed by our readers as a major development of the Society's policy of enlisting the aid of the veterinary profession in its humane work for animals. The selection of Major R. C. G. Hancock, B.SC., M.R.C.V.S. enlists for the R.S.P.C.A. the services of one who, at Beaconsfield, has had wide and long experience in practice. Major Hancock, who comes of a "veterinary line," being the son, grandson and nephew of members of the profession, has rendered much valued service to the N.V.M.A., of which body he was elected President for the year 1943-44.

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Births.—Blanshard.—On January 7th, 1946, at the Rosslyn Nursing Home, West Kirby, Cheshire, to Brenda (*née* Hughes), wife of Major W. Blanshard, R.A.V.C., a daughter (Caroline Brenda).

Westcott.—On January 12th, 1946, at the Hammersmith Hospital, W.12, to Gillian (*née* Howson) and Edward John Westcott, Veterinary Officer, Katsina, Nigeria—a son.

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Captain of Cambridge Rugby.—Our many Rugby enthusiast readers will join us in congratulating Mr. Michael R. Steele-Bodger, veterinary student in residence at Cambridge, on his recent election as Captain of the University XV; also on his most successful first appearance, on Saturday last, as an International player. England confounded the prophets in defeating Wales at Cardiff by 25 points to 13. Commentators picked out Steele-Bodger, who scored England's second try, as being in great form in a pack that, throughout, looked "that little quicker of idea that matters." Our other International, D. W. Deas, also was outstanding amongst the forwards of the Scottish side that, at Murrayfield, inflicted on the New Zealand Army touring side the first defeat of their memorable tour, by 11 points to 6.

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REFRESHER SCHEME FOR MEMBERS FROM THE SERVICES

Brigadier G. A. Kelly, Director of Army Veterinary and Remount Services, writes as follows with reference to our Editorial Note in the correspondence columns of our last issue relating to the release of members from the Forces:—

"Your statement that the release of members may be delayed, should practitioners fail to co-operate in the scheme for refresher courses, is quite erroneous in so far as the Army is concerned.

"The rate of release of veterinary surgeons from the Army will in no way be affected by the formation of a Panel of Veterinary Practitioners, and I shall be grateful if you will make this clear to the profession in the next issue of *The Veterinary Record*."

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AN IMPORTANT HAMPSHIRE W.A.E.C. CONFERENCE

The Mechanization of Milk Production

We reproduce below the programme of a three-day conference, of great interest to all concerned with agricultural progress, which has been arranged by the Hampshire W.A.E.C. on the subject of the mechanization of milk production. Mr. Tom Williams, the Minister of Agriculture, will open the proceedings at the Guildhall, Winchester, at 2.15 p.m. on Tuesday, February 5th, following a

Civic Reception by the Mayor. As will be noted, the speakers are leaders in agricultural thought and development, and it is felt that, in particular, the first and second days' sessions will prove very interesting to members of the profession, whose support will be welcomed. Mr. Geo. N. Gould, the President of the N.V.M.A., will preside over the session on fodder crop production.

The programme will be as follows:—

TUESDAY, FEBRUARY 5TH, 1946

2 p.m.—Civic Welcome by the Right Worshipful the Mayor of Winchester (Alderman C. G. Sankey).

2.15 p.m.—Opening of Conference by the Right Hon. Tom Williams, M.P., Minister of Agriculture.

2.45 p.m.—*First Session.*—Chairman: C. L. Chute, Esq., M.C., Chairman, Hampshire War Agricultural Executive Committee. "Farm Buildings and Milk Production." (*a*) Professor Sir Frank Engledow, C.M.G., M.A., B.SC., Professor of Agriculture, Cambridge University. (*b*) J. Mackie, Esq., Bent, Laurencekirk, Kincardineshire, N.B. Discussion opened by the Right Hon. the Earl of Portsmouth, Vice-Chairman, Central Landowners' Association.

WEDNESDAY, FEBRUARY 6TH, 1946

10 a.m.—*Second Session.*—Chairman: Sir Thomas Baxter, Chairman of the Milk Marketing Board, Thames Ditton, Surrey. (1) "Advantages of Indoor Milking": (*a*) "The Modern Cowshed." William Alexander, Esq., Eynsford, Kent. (*b*) "The Modern Milking Parlour." J. White, Esq., Fyfield Estates, Ltd., Manningford Bohune, Marlborough, Wilts. (2) "Advantages of Outdoor Milking"; "The Portable Bail." A. J. Hosier, Esq., Wexcombe House, Marlborough, Wilts. Discussion opened by R. M. Paterson, Esq., Hatch Warren, Basingstoke.

2.30 p.m.—*Third Session.*—Chairman: J. A. Scott Watson, Esq., C.B.E., M.C., M.A., Chief Education and Advisory Officer, Ministry of Agriculture. "The Design and Use of Dairy Farm Equipment." (*a*) "What the Producer Needs." H. Ebdon, Esq., Deputy Marketing Officer, Milk Marketing Board. (*b*) "Materials, Sterilizing, Cooling." E. Rea, Esq., N.D.A., N.D.D., Agricultural Adviser, Messrs. R. A. Lister & Co., Dursley, Glos. (*c*) "Milking Machines." J. Harrison, Esq., B.SC. (AGRIC.), Agricultural Consultant, Surbiton Court, Surbiton, Surrey. Discussion opened by Miss Barbara Fischer, N.D.D., B.Q.F.D., Advisory Bacteriologist, Jobs Dairies, Hanworth Middlesex.

7 p.m.—Brains Trust: Mrs. Cosmo Douglas, Hazelby, Newbury; E. T. Parker, Esq., Charity Farm, Fareham; W. T. Price, Esq., M.C., B.SC., P.A.S.I., N.D.A., Executive Officer, Wilts W.A.E.C.; J. B. Douglas, Esq., Barstibly, Castle Douglas, Kirkcudbrightshire; F. R. Stovold, Esq., Eashing Farm, Godalming; J. Hedges, Esq., North End Farm, Chandlersford, Hants. Question Master: Donald McCullough, Esq., British Broadcasting Corporation.

THURSDAY, FEBRUARY 7TH, 1946

10 a.m.—*Fourth Session.*—Chairman: J. Fawcett, Esq., Chairman, Hampshire County Branch, National Farmers' Union. (1) "The Application of Electric Power in the Dairy and Farm Buildings." C. A. Cameron Brown, Esq., B.SC., M.I.E.E., M.I.B.A.E., Edmundson's Electricity Corporation, 25-30, Gillingham Street, London, S.W.1. (2) "Grass and Fodder Crop Drying." David Fairclough, Esq., Agricultural Consultant, Brook House, Cann Lane, Appleton, nr, Warrington, Lancs. Discussion opened by J. S. Morrey, Esq., The Field, Market Drayton, Salop.

2.30 p.m.—*Fifth Session.*—Chairman: G. N. Gould, Esq., M.R.C.V.S., President, National Veterinary Medical Association. (1) "Mechanization of Fodder Crop Production on the Dairy Farm." C. Culpin, Esq., M.A. (Author of *Farm Machinery*), Nuffield Mechanizations, Ltd., Birmingham. (2) "Mechanization of Fodder Crop Harvesting on the Dairy Farm." W. H. Cashmore, Esq., B.A., N.D.A., National Institute of Agricultural Engineering, Askham Bryan, York. Discussion opened by Captain L. R. Bomford, D.S.O., M.C., Tufton Warren, Whitchurch.

4.15 p.m.—Summary and Closing. J. L. Davies, Esq., M.A., Assistant General Manager, Milk Marketing Board, and Milk Production Officer, Ministry of Agriculture.

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"NATIONAL POLICY NEEDED FOR ANIMAL HEALTH"

In its issue of Monday last *The Times* published letters from the Duke of Norfolk and Dr. John Hammond in support of the plea for the above made by the Agricultural Correspondent of that paper in the main article appearing on January 14th.

The Duke of Norfolk, who states that he considers that the article gave a very fair picture of the present needs for improvement in the facilities for veterinary education and for bold planning for the control of animal disease, proceeds: "It is certainly very difficult for the profession wholeheartedly to push for developments of this nature if they have no assured idea of the intentions of the Ministry of Agriculture on these matters. It is undoubtedly possible to deduce from the recent internal reorganization of the Ministry that the Animal Health Division will play a much less effective part in the future plans of the Ministry for the improvement of the quality and productivity of our dairy stock. Surely it is logical to expect the veterinary profession to assume the supervision and co-ordination of these activities on behalf of the State.

The Duke adds: "In your reference to the probable improvement in the educational facilities, you refer to the Veterinary Educational Trust. As President of that body I should like to assure your readers in general, and particularly those interested in agriculture, that we regard our task of helping with the development of veterinary specialists, both in research and in practice, as being one needing the support of all agriculturists. There is an immense amount of work for the benefit of our animals and their products awaiting development, work which cannot reasonably be expected to be undertaken by the State, even nowadays. These developments the trust is anxious to secure. They can only take place, however, if those interested in animals themselves give their wholehearted support."

Dr. John Hammond regards the article as "very timely" and says: "It cannot be too strongly stressed that a bold policy of dealing with the ravages of disease in livestock is needed for the development of our animal industry.

"In view of the present, and possible future, shortages of milk and meat it is essential that the increase in the number and the quality of livestock should be as rapid as possible, and this in large measure depends on an efficient veterinary service. Thus the matter is one which not only affects the farmer but also the general public and consumer, and so is one of national interest.

"A strong veterinary service and bold policy for the elimination of disease among livestock is therefore a matter of urgency."

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The programme of a sessional meeting to be held by the Royal Sanitary Institute at Weymouth Guildhall on January 26th, includes a paper by Mr. A. D. Campbell, M.R.C.V.S., Ministry Veterinary Officer, on "Bovine Diseases Communicable to Man." The session will open at 10 a.m.

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SCHEME FOR THE CONTROL OF DISEASES OF DAIRY CATTLE

STATEMENT SHOWING THE NUMBER OF UNDERTAKINGS NOTIFIED TO THE MINISTRY OF AGRICULTURE AND FISHERIES DURING THE MONTH ENDED DECEMBER 31ST, 1945

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
ENGLAND					
Bedford	—	34	34	776	438
Berks	—	91	91	3,083	1,994
Bucks	—	96	96	3,200	1,895
Cambridge	—	10	10	190	79
Chester	1	357	358	11,975	4,585
Cornwall	—	4	4	72	75
Cumberland	—	55	55	1,344	1,126
Derby	3	327	330	9,421	5,408
Devon	1	302	303	4,493	2,628
Dorset	—	67	67	2,100	1,123
Durham	3	259	262	5,592	2,304
Essex	1	219	220	6,972	3,984
Gloucester	—	92	92	2,487	1,703
Hampshire	5	380	385	11,032	7,425
Hereford	—	18	18	339	216
Hertford	—	81	81	2,388	1,559
Hunts	—	7	7	253	192
Isle of Ely	—	1	1	57	21
Isle of Wight	—	9	9	171	94
Kent	1	167	168	4,193	2,561
Lancs	—	180	180	5,260	1,855
Leics	—	102	102	2,517	1,872
Lincs (Holland)	—	3	3	25	11
Lincs (Kesteven)	—	23	23	323	160
Lincs (Lindsey)	—	103	103	1,973	1,198
Middlesex	—	13	13	414	212
Norfolk	—	151	151	4,764	3,617
Northants	1	77	78	2,263	1,905
Northumberland	—	61	61	1,968	1,169
Notts	2	181	183	4,019	2,427
Oxford	—	44	44	1,211	1,874
Rutland	—	8	8	156	107
Salop	—	239	239	6,723	3,522
Soke of Peterborough	—	—	—	—	—
Somerset	1	242	243	6,447	3,003
Staffs	—	188	188	5,620	3,447
Suffolk, E.	—	69	69	1,635	1,188
Suffolk, W.	2	45	47	1,085	661
Surrey	—	101	101	2,879	1,397
Sussex, E.	2	169	171	4,298	2,738
Sussex, W	1	107	108	3,118	1,871
Warwick	1	129	130	2,994	2,091
Westmorland	—	8	8	257	295
Wilts	—	85	85	3,435	1,586
Worcester	—	156	156	3,060	1,616
Yorks, E.R.	—	96	96	1,494	918
Yorks, N.R.	1	110	111	3,305	1,909
Yorks, W.R.	1	228	229	5,541	2,189
WALES					
Anglesey	—	49	49	842	602
Brecon	—	11	11	168	99
Caernarvon	—	109	109	1,701	952
Cardigan	1	29	30	539	383
Carmarthen	2	256	258	4,789	2,535
Denbigh	—	30	30	726	335
Flint	—	83	83	1,864	878
Glamorgan	2	94	96	1,537	687
Merioneth	—	9	9	117	55
Monmouth	—	54	54	1,287	712
Montgomery	—	13	13	264	222
Pembroke	—	61	61	1,186	834
Radnor	—	—	—	—	—
TOTALS	32	6,292	6,324	161,802	90,451

Notes.—(1) Operative periods of undertakings: 1 year, 1,509; 2 years, 447; 3 years, 4,368. (2) Undertakings renewed for further periods: 1 year, 1,676; 2 years, 215; 3 years, 542. (3) Undertakings not renewed at end of operative period, 1,416. (4) The figures showing the number of undertakings notified during the month, relate to entirely fresh undertakings and do not includ. undertakings renewed for further periods. Undertakings which have been cancelled or not renewed and are not included in the figures for previous notifications.

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
SCOTLAND					
Aberdeen	—	16	16	863	407
Angus	—	16	16	606	426
Argyll	—	5	5	101	111
Ayr	—	12	12	380	318
Banff	—	1	1	120	20
Berwick	—	1	1	20	—
Bute	—	—	—	—	—
Caithness	—	—	—	—	—
Clackmannan ..	—	4	4	160	79
Dumfries	—	9	9	456	444
Dumbarton	—	1	1	60	40
East Lothian ..	—	1	1	20	8
Fife	—	27	27	957	432
Inverness	—	4	4	232	121
Kincardine	—	3	3	127	83
Kinross	—	3	3	56	40
Kirkcudbright ..	—	4	4	240	77
Lanark	—	14	14	574	409
Midlothian	—	—	—	—	—
Moray	—	—	—	—	—
Nairn	—	—	—	—	—
Orkney	—	—	—	—	—
Peebles	—	2	2	28	16
Perth	—	20	20	552	394
Renfrew	1	4	5	185	135
Ross-shire	—	1	1	40	34
Roxburgh	—	—	—	—	—
Selkirk	—	—	—	—	—
Stirling	—	17	17	558	501
Sutherland	1	4	5	92	44
West Lothian ..	—	1	1	23	18
Wigtown	—	12	12	596	258
Zetland	—	—	—	—	—
TOTALS ..	2	182	184	7,026	4,415

Notes.—(1) Duration of undertakings: 1 year, 28; 2 years, 12; 3 years, 144. (2) Undertakings renewed for a further period (included in column 2 of statement): 1 year, 53; 2 years, 7; 3 years, 25. (3) Undertakings expired and not renewed (not included in column 2 of statement): 198. (4) The figures showing the number of undertakings notified during the month relate to entirely fresh undertakings.

* * * * *

"*The Dabblers.*"—"With so many authorities dabbling in the problem," states Walton-le-Dale's Medical Officer in his annual report, "the poor liaison between them, and the cautious and time-wasting methods of reporting, it has proved a problem still unsolved to produce a completely satisfactory quality of milk."

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Please Return "Empties."—In response to urgent requests for our aid in this matter from firms anxious to meet veterinary orders promptly but who are seriously handicapped through the shortage of cases and boxes, we would ask our readers to return their empty containers as soon as possible. It is impossible for suppliers to buy cases or the wood to make them, and the co-operation of practitioners, we are assured, is essential in their own interests.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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THE DYED GREYHOUND CASE

Sir,—I read with great interest and not a little amusement the article under the above heading in your issue of December 15th by Mr. Hamilton Kirk and I feel that his interpretation and summing up of the case is very much at variance with the opinion of many people who heard the evidence. I wonder whether, by this article, Mr. Kirk is attempting to convince the profession or to convince himself.

I do not propose to go into all the details of the case, but the following two points I would raise:—

In the first paragraph Mr. Kirk says: "The prosecution based its case upon the discovery of a few dyed hairs (probably less than a dozen)." This statement I consider entirely misleading, the correct position being that about a dozen hairs were extracted from the pelt purely as a sample for microscopical examination and were not, by any manner of means, any indication of the number of dyed hairs present in that pelt.

The major point which Mr. Kirk's article raises is the question of the casting of the coat in a dog. I would suggest first that Mr. Kirk should differentiate between the under-coat and the guard hairs and whether he considers that both are cast equally. He further suggests that all hairs are shed at least annually but probably bi-annually.

Taking the very obvious cases, surely he does not suggest that terriers—wire, Airedale, West Highland, Cairn, Scottie, etc.—or the Old English Sheep Dog cast all their guard hairs every year. I feel sure that he must have seen specimens of all these breeds with guard coats that were obviously of many years' standing and I think you will agree that it is because of their inability to cast these hairs that stripping is employed.

Much reference has been made to the Arctic Fox and, while this is very interesting, surely it is totally irrelevant considering the extremes under which this animal lives. Again, what a dog's coat would do if he were permitted to live a natural life out of doors in this country is surely different from what actually happens to dogs that are housed in a moderately level temperature.

In this case there was also the question that this dog's coat had been clipped and not shaved and it is obvious that in clipping, mature, practically mature and immature hairs would all be cut, leaving, if the animal had been dyed, a certain amount of dyed fibre close to the skin. This is an artifact and would it have any effect on normal shedding?

In order definitely to clear up many of these points, preparations are now being made to carry out a series of properly controlled and recorded experiments and it is hoped that results will be published in due course.

Yours faithfully,

16, Ward Street, Glasgow, C.4. A. H. ROBB.
January 9th, 1946.

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SIR FRANK COLYER'S R.C.S. ODONTOLOGICAL COLLECTION

Sir,—Sir Frank Colyer, Honorary Curator of the Odontological Collection of the Royal College of Surgeons, would be most grateful for a horse's skull showing a temporal odontome and for skulls of animals illustrating dental lesions. Notes of the clinical history and age of the animal would enhance the interest of the specimen.

The veterinary profession is most grateful to Sir Frank for over 50 years' work on animal odontology, in which he is a pre-eminent authority. He has built up the most extensive comparative collection for the Museum of the Royal College of Surgeons. Fortunately the greater part of it has escaped war damage and Sir Frank is now engaged reassembling it for exhibition.

Would members kindly address their gifts to Sir Frank at the Museum of the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.1, or should they find it more convenient to address their specimens to me I will see that Sir Frank receives them.

I have the honour to be, Sir,
Your obedient servant,

529a, Finchley Road, London, N.W.3. TOM HARE.
January 21st, 1946.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange •	Sheep Scab	Swine Fever
Dec. 16th to 31st, 1945 ...	4	2	—	3	22
Corresponding period in—					
1944 ...	8	6	—	12	53
1943 ...	8	9	—	33	23
1942 ...	24	8	1	18	17
Total Jan. 1st to Dec. 31st, 1945 ...	119	129	6	121	928
Corresponding period in—					
1944 ...	189	181	8	245	1,449
1943 ...	283	27	9	257	547
1942 ...	372	670	28	283	451

NOTE.—The figures for the current year are approximate only.
• Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at December 31st, 1945, was as follows:—

ENGLAND	WALES	SCOTLAND	TOTAL (GREAT BRITAIN)
5,272	9,147	5,617	20,036